



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/869,981	10/01/2001	Kenneth Lloyd Riley	GJH-0002	4612

7590 06/04/2004
Gerard J Hughes
ExxonMobil Research & Engineering Company
PO Box 900
Ammandale, NJ 08801-0900

EXAMINER

NGUYEN, TAM M

ART UNIT

PAPER NUMBER

1764

DATE MAILED: 06/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
09/869,981	RILEY ET AL.	
Examiner	Art Unit	
Tam M. Nguyen	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) ☐ Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on January 9, 2004 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho (4,902,404) in view of Howard et al. (4,392,945).

Claim 1:

Ho discloses a process for hydrotreating a hydrocarbon feed by feeding the feed into a first hydrotreating zone which is operated in the presence of hydrogen and a catalyst to remove sulfurs from the feed. The effluent from the first hydrotreating zone is then passed into a second hydrotreating zone to produce a final product. The bulk multimetallic catalyst in the second hydrotreating zone comprises a metal of Group VIII such as nickel and two metals of Group VIB such as Mo and W. It is noted that Ho does not specifically disclose that the ratio of Group VIB metal to Group VIII non-noble metal is from about 10:1 to about 1:10. However, Ho discloses that the bulk catalyst comprises about 0.5-20 wt % of Group VIII metal and about 5-30 wt. % of Group VIB metals. It is estimated that the ratio of Group VIB metals to Group VIII metal would be within 10:1 to 1:10. It is also noted that Ho does not specifically disclose that the effluent from the first hydrotreating zone comprises less than about 3,000 ppm. Since the Ho process is similar to the claimed process in terms of feedstock and catalyst, it would be expected that the effluent of from the first stage of Ho would comprise less than about 3,000 ppm as claimed. (See col. 3, line 30 through line 44, col. 8, line 7; Table I)

Ho does not disclose that the effluents from the first and second hydrotreating zones are passed into separation zones to produce vapor streams and liquid streams.

Howard discloses a two-zone hydrotreating process wherein the effluents from the first and second hydrotreating zones are passed into separation zones. (See col. 3, lines 11-15; col. 4, lines 6-16; the Figure)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Ho by passing the effluents from the first and second hydrotreating zone to separation zones to produce gaseous streams and liquid streams as taught by Howard because such separation zones are effective to recover hydrogen and light gaseous for reuse and to separate contaminants such as H_2S and NH_3 from the liquid product

Claim 2:

The metal of Group VIII is selected from Ni and Co and the Group VIB metals are selected from Mo and W. (col. 3, lines 46, 47 and 49; col. 4, lines 15-16)

Claims 3 and 4:

The catalyst is derived from a precursor represented by the formula: $ML(Mo_yW_{1-y}A_d)_a$ where M is selected from metals including Ni; $0 \leq y \leq 1$; A is O or S. It is understood that subscript b of M is 1.

It is estimated that when $y = 0.5$ the molar ratio of $b / (c+d) = 1$ where $c = y$ and $d = 1-y$.

The formula is the same as the claimed formula. (See col. 4, lines 19-36).

Claim 5:

The molar ratio $c/d = y/(1-y)$. When $y = 0.5$, the molar ratio would equal 1 which is greater than 0.01/1.

Claim 6:

Ho does not disclose that the catalyst is essentially an amorphous material and has a crystalline peaks at $d = 2.53$ Angstroms and $d = 1.7$ Angstroms. However, the Ho catalyst is not a zeolite and is essentially the same as the claimed catalyst. Therefore, the Ho catalyst is an amorphous material and would have crystalline peaks as claimed.

Claim 7:

The Ho catalyst is essentially the same as the claimed catalyst, so it would be expected that the Ho catalyst would have an acid function as claimed.

Claim 8:

The feedstock has a boiling point of from $25-210^{\circ}\text{C}$. The first and second hydrotreating zones are operated at a temperature of from about 200 to 450°C , at a pressure of from 150 to 5000 psig (10.3 to 345 bar), at a space velocity of $.1-10\text{ h}^{-1}$, and hydrogen gas rate of 100 to $10,000$ SCF/B. (See col. 2, lines 59-68; col. 8, lines 60 through col. 9, line 10)

Claim 9:

The feedstock comprises at least one of naphtha, diesel, hydrogen gas oil, lube oil, and residuum. (See col. 8, lines 60 through col. 9, line 10)

Claim 10:

The feedstock is naphtha having a boiling point in the range of $25-210^{\circ}\text{C}$. The second hydrotreating zone is operated at a temperature of from about 200 to 450°C , at a pressure of 150 to 800 psig (10.3 to 55.1 bar), at a space velocity of 0.5 to 10 V/V/hr , and at a hydrogen gas rate of 100 to 2000 SCF/B. (see col. 8, lines 61-62; col. 9, lines 1-6)

Claim 11:

The feedstock is diesel having a boiling point in the range of 170-350° C. The second hydrotreating zone is operated at a temperature of from about 200 to 400° C, at a pressure of 250 to 1500 psig (17.2 to 103.4 bar), at a space velocity of 0.5 to 6 V/V/hr, and at a hydrogen gas rate of 500 to 6000 SCF/B. (see col. 8, lines 63-64; col. 9, line 7)

Claim 12:

The feedstock is heavy gas oil having a boiling point in the range of 325-475° C. The second hydrotreating zone is operated at a temperature of from about 260 to 430° C, at a pressure of 250 to 2500 psig (17.2 to 172.3 bar), at a space velocity of 0.3 to 4 V/V/hr, and at a hydrogen gas rate of 100 to 10,000 SCF/B. (see col. 8, lines 64-65; col. 9, line 7)

Claim 13:

The feedstock is a lubricating oil having a boiling point in the range of 290-500° C. The second hydrotreating zone is operated at a temperature of from about 200 to 450° C, at a pressure of 100 to 3000 psig (6.9 to 207 bar), at a space velocity of 0.2 to 5 V/V/hr, and at a hydrogen gas rate of 100 to 10,000 SCF/B. (see col. 8, lines 65-66; col. 9, line 8)

Claim 14:

The feedstock is a residuum having a boiling point above about 575° C. The second hydrotreating zone is operated at a temperature of from about 340 to 450° C, at a pressure of 1000 to 5000 psig (69 to 345 bar), at a space velocity of 0.1 to 2 V/V/hr, and at a hydrogen gas rate of 2000 to 10,000 SCF/B. (see col. 8, lines 66-68; col. 9, line 9)

Claim 15:

Ho does not specifically disclose the physical characteristics of the bulk catalyst. However, the bulk catalyst of Ho is essentially the same as the claimed catalyst. It would be expected the bulk catalyst of Ho would have similar physical characteristics as claimed.

Claim 16:

Ho does not disclose that the bulk catalyst has a core-shell structure. However, the catalyst is prepared from a precursor as the disclosed precursor. Therefore, it would be expected that the Ho catalyst would have a core-shell structure as claimed.

Claims 17-19:

Ho does not specifically disclose that at least one of the first or second stage catalyst further comprises a second catalyst. However, Ho discloses that the process comprises two or more catalyst zones or stages that contain one or two reactors comprising catalysts that has a desulfurization and/or denitrogenation and the two catalysts can be stacked in a single reactor. catalyst (see col. 3, lines 35-38; col. 4, lines 4-8)

Claim 20:

The bulk catalyst is a sulfided catalyst (see col. 8, line 35-36)

Claim 21:

Howard discloses that ammonia is separated in the separation zones (see the Figure; col. 3, lines 10-16).

Ho does not disclose that first stage is operated in concurrent mode while the second stage is operated in countercurrent mode.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Ho by operating the process in the claimed

modes because the hydrocarbon feed would be successfully contacted with hydrogen in either concurrent or countercurrent modes. Therefore, it would be expected that the results would be the same or similar when the first stage is operated in either concurrent mode or countercurrent mode and the second stage is operated in countercurrent mode or concurrent mode.

Claims 22-23.

Howard does not specifically disclose that the second vapor stream is condensed.

Howard, however, discloses that the second vapor is processed to remove hydrogen sulfide and ammonia from light gaseous which is then recycled to either to the first or second stages (see col. 4, lines 6-15).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Ho/Howard by condensing the second vapor stream as claimed because the condensing step is effective to separate hydrogen sulfide and ammonia from light gaseous.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over references as applied to claim 1 above, and further in view of Ho et al. (5,841,013) (hereafter Ho'013).

Ho does not disclose that the second stage process conditions are hydrodearomatization conditions.

Ho'013 discloses a catalyst which is the same as the Ho catalyst. Ho'013 also discloses that the catalyst is also effective in a hydrodearomatization process. (See abstract)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Ho by operating the second stage under

hydrodesulfurization/hydrodearomatization conditions because the catalyst is effective in both hydrodesulfurization and hydrodearomatization conditions.

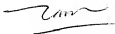
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tam M. Nguyen whose telephone number is (571) 272-1452. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tam M. Nguyen
Examiner
Art Unit 1764



TN